

WHAT IS CLAIMED IS:

1. A field sequential liquid crystal display device, comprising:
a liquid crystal panel having an upper substrate, a lower substrate and a liquid
5 crystal layer therebetween;
a backlight device under the liquid crystal panel for irradiating light to the liquid
crystal panel and having three color light sources; and
an image signal processor controlling a sequential lighting order and combination of
the three color light sources.

10 2. The device according to claim 1, wherein each of the three color light sources
has one of colors Cyan, Magenta and Yellow.

15 3. The device according to claim 1, wherein each of the three color light sources
has one of colors Red, Green and Blue.

4. The device according to claim 1, wherein the image signal processor changes
the lighting order and combination of the three color light sources depending on
image characteristics displayed in the liquid crystal panel.

20 5. The device according to claim 1, wherein the liquid crystal layer is Optical
Compensated Birefringent (OCB) mode.

6. The device according to claim 1, wherein the liquid crystal layer is

Ferroelectric Liquid Crystal (FLC) mode.

7. The device according to claim 1, wherein the three color light sources are sequentially lit for up to about 1/180 second at three subframes when one frame period is approximately 1/60 second.

8. The device according to claim 7, wherein a lighting time of each of the light sources at each subframe is less than 1/180 second.

9. A color image display method for a field sequential liquid crystal display device that includes a liquid crystal panel having an upper substrate, a lower substrate, a liquid crystal layer therebetween, and a plurality of pixels; a backlight device under the liquid crystal panel for irradiating light to the liquid crystal panel and having Red, Green and Blue light sources; and an image signal processor controlling a sequential lighting order and combination of the Red, Green and Blue light sources, the method comprising the steps of:

dividing one frame into first, second and third subframes, wherein each subframe has a period of approximately one-third of one frame period;

applying an image signal to each pixel of the liquid crystal panel through the image signal processor, the image signal depending on image characteristics displayed in the liquid crystal panel; and

lighting the Red, Green and Blue light sources at the subframes through the image signal processor by way of combining the lighting order of the Red, Green and Blue

light sources.

10. The method according to claim 9, wherein the combination of the Red (R),
Green (G), and Blue (B) light sources turned on each subframe is one of
5 sequential combinations consisting of B+G, R+B and R+G to display Cyan (C),
Magenta (M) and Yellow (Y) colors, respectively, when the displayed image
requires a higher brightness.

11. The method according to claim 10, wherein the image signal processor
10 converts the image signal into a signal corresponding to a C-M-Y mode when
the C, M and Y colors are generated, and applies the converted signal to the
plurality of the pixels.

12. The method according to claim 11, wherein the image signal processor
15 sequentially lights the R, G and B light sources at each subframe in accordance
with the C-M-Y mode.

13. The method according to claim 9, wherein one frame period is
approximately 1/60 period.

14. The method according to claim 9, a lighting time of each of the Red, Green
and Blue light sources is less than about 1/180 second.

15. The method according to claim 9, wherein one of the R, G and B light sources are turned on and off more frequently than the other two light sources when the displayed image needs an emphasized color.

5 16. The method according to claim 15, wherein the R light sources is turned on and off not only at the first subframe but also at least one of the second and third subframes when the emphasized color is Red.

10 17. A color image display method for a field sequential liquid crystal display device that includes a liquid crystal panel having an upper substrate, a lower substrate, a liquid crystal layer therebetween, and a plurality of pixels; a backlight device under the liquid crystal panel for irradiating light to the liquid crystal panel and having Red (R), Green (G) and Blue (B) light sources; and an image signal processor controlling an image signal and a sequential lighting order and combination of the Red, Green and Blue light sources, the method comprising the steps of:

15 expressing a brightness of each component R, G and B with a gray level having 256 levels;

20 setting the brightness of each component R, G and B as a maximum brightness when the brightness of each component R, G and B has a value of gray level of at least 127;

calculating the average brightness value of each of the components R, G and B; classifying cases in accordance with the image signal by which the average

brightness values of the components R, G and B is greater than the maximum
brightness of the displayed image; and
determining which light sources are turned on at the subframes in each case.

- 5 18. The method according to claim 17, wherein the number of the turned-on
light sources at each subframe is less than two.
- 10 19. The method according to claim 17, wherein classifying the cases depends on
a range of the average brightness values of the component R, G and B.
- 15 20. The method according to claim 17, wherein turning on the light sources is
determined by a value that doubles respective minimum values of the
components R, G and B in chromaticity coordinates.
21. The method according to claim 17, wherein the liquid crystal layer is
Optical Compensated Birefringent (OCB) mode.
22. The method according to claim 17, wherein the liquid crystal layer is
Ferroelectric Liquid Crystal (FLC) mode.

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